INDUSTRY MANPOWER SURVEYS/ Number 114

Reprinted From AREA TRENDS IN EMPLOYMENT AND UNEMPLOYMENT, April 1968

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Manpower Developments and Outlook in the COMPUTING AND ACCOUNTING MACHINES INDUSTRY

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MANPOWER DEVELOPMENTS AND OUTLOOK IN THE COMPUTING AND ACCOUNTING MACHINES INDUSTRY[1/]

HIGHLIGHTS

Greater needs for gathering, storing, and retrieving data have resulted in rapid growth of employment in the computing and accounting machines industry. In 1967, this industry's workforce totaled 182,200 reflecting a sizable rise over the 1966 total, and about double the figure of 10 years ago. Value of industry shipments increased almost 400 percent over the last decade.

A major problem facing the computing and accounting machines industry is a shortage of qualified manpower. More than half of the establishments participating in a November 1967 survey conducted by the United States Employment Service and its affiliated State and local offices reported difficulty in recruiting needed workers. Twenty-five establishments--accounting for more than one-quarter of total surveyed employment--indicated that manpower shortages were impeding production to some degree. Engineers, clerical workers, and electronics assemblers were most in demand. The largest number of unfilled industry jobs were reported in the Los Angeles-Long Beach and Minneapolis-St. Paul areas.

In order to alleviate shortages of production workers, and prepare for manpower needs in the future, the majority of firms participating in the survey offer various kinds of training programs. On-the-job training--including that provided under the Manpower Development and Training Act (MDTA)--and apprenticeship training programs are utilized frequently. In addition, many establishments have increased overtime and hired women for jobs traditionally held by men. Although wages in the computing and accounting machines industry are generally well above the average for all manufacturing industries, production workers' earnings did not keep pace with the increase for all manufacturing in 1967.

1/ By Alan L. Moss and Norma F. Ausmus, Labor Economists, Division of Job Market Information and Economic Analysis, USES. The industry covered by this article is designated as computing and accounting machines, including cash registers, 1957 Standard Industrial Classification Code 3571. Chief industry products include adding, calculating, bookkeeping and accounting machines, cash registers, punched card and coded media, electronic computers and coin- and currency-handling machines. This analysis is based largely upon 102 individual establishment reports gathered in November 1967 by local offices of the State employment services affiliated with the Bureau of Employment Security. These establishments, having a minimum employment of 100, represent over 90 percent of total employment in the industry. National employment data were obtained from the Bureau of Labor Statistics. Additional information was obtained from various government agencies and personal interviews.

Due to the large number of professional and technical personnel employed by the industry in research and development activities, production workers account for only one-half of total employment (as compared with about three-quarters for all manufacturing industries). The number of women employed in the computing and accounting machines industry has increased about 2 1/2 times over the past decade, to 49,000 in 1967. They now constitute more than one-quarter of the industry's workforce, about average for all manufacturing industries.

Employment in the 102 surveyed establishments--representing over 90 percent of total industry employment--is located mainly in the North Central, Northeast, and Western regions. Over half of the surveyed employment was located in three States--New York (36,140), California (34,700), and Minnesota (24,900). Major industry employment centers are the Minneapolis-St. Paul and Los Angeles-Long Beach areas with industry employment of approximately 20,000 in each, and New York City with 9,000.

According to projections made by participating establishments, total industry employment will increase about 4 percent between November 1967 and May 1968. The Business and Defense Services Administration (BDSA) recently projected a 15 percent rise in value of shipments during 1968. Plants have been operating at capacity and many new facilities are under construction.

Employment and Shipments Rise

Employment changes in the computing and accounting machines industry reflect the Nation's growing economy, and its increased need for systematizing the record keeping and information processes. In addition, computers--running around the clock--now control manufacturing operations, assist engineering planning, and coordinate distribution centers. Reaching an all-time annual high of 182,200 in 1967, employment in this industry gained 9 percent over the previous year's total. Employment has more than doubled since 1958. (See table 1 and figure 1.)

Behind this surge in employment has been a strong domestic and foreign demand for the industry's products. In 1967, value of shipments rose more than 10 percent from the previous year to $5.3 billion. 1/ This is almost five times as great as the 1958 total. Foreign demand was evidenced by an over the year gain in value of exports of $147 million. 2/ Although imports also were on the rise, the industry enjoyed its largest trade surplus in history--$485 million.

Since research and development is vital to progress in this industry, its workforce includes many highly technical people--scientists, engineers, and

1/ U.S. Department of Commerce, Business and Defense Services Administration.
2/ Ibid.

supporting personnel. Production workers account for only one-half of industry employment compared to three-quarters for all manufacturing industries. Blue collar workers have a wide range of skills--from those who have completed 2 years of formal electronics training and do final testing of computers, to those with no specialized education who connect wires to a panel with the use of a diagram. Total production worker employment was 101,600 in 1967, reflecting an 8 percent gain over the 1966 total and a 78 percent increase from 1958.

Employment of women in the computing and accounting machines industry has increased, both in number and as a share of total industry employment, over the years. Contributing to the rise in the employment of women in this industry--an increase of almost 150 percent between 1958 and 1967--have been a number of factors. There has been an overall expansion of employment accompanied by difficulty in recruiting qualified male personnel. In addition, some of the work has been particularly suitable for women due to such requirements as a high degree of finger dexterity, and the need for patience to work at tasks of a somewhat tedious and detailed nature.

The industry outlook is for continued growth in both employment and shipments. An expanding workforce was projected by the surveyed establishments. They foresaw a 4 percent gain by mid-1968. The Business and Defense Services Administration projected 1968 value of shipments to be $6.1 billion, a 15 percent increase over 1967. Value of exports in 1968, also projected by BDSA, is anticipated to be 25 percent above the 1967 level.

Table 1--Annual Value of Shipments and Annual Average Employment in the Computing and Accounting Machines Industry

Year	Annual value of shipments (millions)	Annual average employment (in thousands)			Production workers as a percent of total
		Total	Women	Production workers	
1958	$1,104	90.4	19.9	57.1	63.2
1959	1,302	93.9	21.6	60.2	64.1
1960	1,556	101.4	23.2	63.5	62.6
1961	1,677	107.7	24.2	64.7	60.1
1962	1,833	115.0	26.7	68.0	59.1
1963	2,020	119.9	27.7	68.3	57.0
1964	3,011	129.8	30.8	72.6	55.9
1965	3,353	146.7	36.5	82.7	56.4
1966	4,833	167.5	44.2	94.2	56.2
1967	5,325 1/	182.2	49.2	101.6	55.8

1/ Estimated.

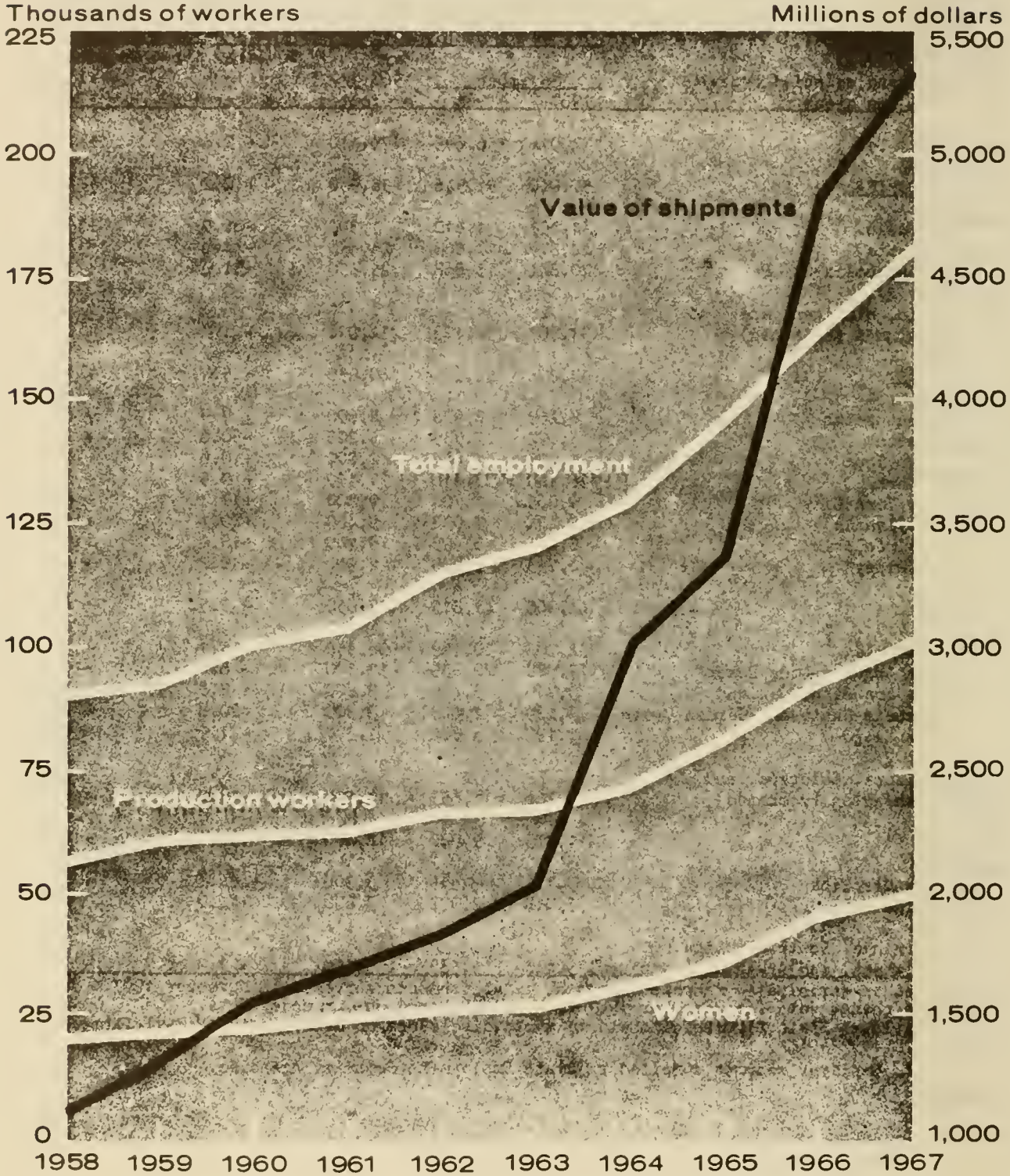
Source: Bureau of Labor Statistics and Business and Defense Services Administration.

Figure 1.

Employment and Shipments

COMPUTING AND ACCOUNTING MACHINES INDUSTRY

1958-1967 1/



1/ Value of shipments for 1967 estimated.

Source: Bureau of Labor Statistics and Business and Defense Services Administration.

Table 2--Employment and Labor Requirements in Surveyed Establishments in the Computing and Accounting Machines Industry, by Region, State, and Selected Areas

November 1966 to May 1968

Regions and selected States and areas	Total employment			Percent change	
	November		May 1968 1/ projected	November 1966 to November 1967	November 1967 to May 1968 1/
	1967	1966			
Total	172,076	156,695	178,450	+ 9.8	+ 3.7
NORTH CENTRAL	57,840	51,546	58,950	+12.2	+ 1.9
Wisconsin	1,158	1,810	1,300	-36.0	+13.5
Minnesota	24,879	17,563	25,650	+41.6	+ 3.1
Minneapolis-St. Paul	20,844	15,868	21,450	+31.4	+ 3.0
Other 2/					
Ohio, Michigan, and Illinois (combined)	31,803	32,173	32,000	- 1.2	+ 0.5
NORTHEAST	57,375	54,294	60,050	+ 5.7	+ 4.7
Massachusetts	8,269	8,978	8,600	- 7.9	+ 4.0
Boston	5,092	7,335	5,200	-30.6	+ 2.4
Connecticut	1,799	1,623	2,000	+10.8	+11.1
New York	36,140	33,616	37,150	+ 7.5	+ 2.8
New York City	9,065	7,704	9,800	+17.7	+ 8.4
Pennsylvania	8,454	7,038	9,400	+20.1	+11.6
Philadelphia	8,254	6,993	9,100	+18.0	+10.1
New Jersey	2,713	3,039	2,900	-10.7	+ 6.4
WEST	44,968	41,815	47,050	+ 7.5	+ 4.7
California	34,702	30,162	36,550	+15.1	+ 5.4
Los Angeles-Long Beach	19,588	20,835	17,500	- 6.0	-10.7
San Francisco-Oakland	3,759	3,456	3,800	+ 8.8	+ 1.4
Anaheim-Santa Ana-Garden Grove	3,139	2,603	3,300	+20.6	+ 4.6
San Diego	1,192	806	1,300	+47.9	+ 8.1
Other 2/					
Arizona, Colorado, and Washington (combined)	10,266	11,653	10,500	-11.9	+ 2.4
SOUTH	11,893	9,040	12,400	+31.6	+ 4.2
North Carolina	3,131	555	3,300	+464.1	+ 4.3
Florida	3,618	2,902	3,600	+24.7	N.C.
Other 2/					
Virginia, South Carolina, Oklahoma, and Arkansas (combined)	5,144	5,583	5,500	- 7.9	+ 7.2

1/ Based on anticipated manpower needs of establishments surveyed in November 1967. Percentage change data for November 1967 to May 1968 based on unrounded data.
2/ Individual State figures withheld to avoid disclosure of data for individual firms.

Source: Employer reports compiled by State Employment Security Agencies.

Areas Affected by Industry's Growth

According to the November 1967 survey of the computing and accounting machines industry conducted by the Federal-State network of the United States Employment Service, about two-thirds of the industry's employment is concentrated in the North Central and Northeastern Regions of the Nation, with about one-fourth in the West, and the remainder in the South. (See table 2.) Employment in the North Central States rose 12 percent between November 1966 and November 1967, while gains in the West and Northeast were about half as much. While still small compared with other major regions in terms of industry employment, the South showed the greatest percentage gain in the year ending November 1967. All four regions expected further increases in industry payrolls between November 1967 and May 1968.

The survey revealed a somewhat irregular pattern of industry employment growth last year between certain States and their constituent major areas of industry employment. While California's employment increased more than 15 percent over the year to 34,700 in November 1967, employment in the Los Angeles-Long Beach area dropped to 19,600, a decline of 6 percent. This was due to the opening of new plants in California's more rural areas. On the other hand, industry employment in the New York City area--over 9,000 in November 1967--gained 18 percent, while employment in the State as a whole--more than 36,000--increased by only 8 percent from a year earlier. Employment in the Boston, Mass., area dropped by over 2,000 during the year, while the decline in the State as a whole was only one-third as great.

Employment Gains Most in West During Past Decade

Accompanying the rapid expansion of employment in the computing and accounting machines industry over the past decade has been a marked shift in the geographic distribution of the industry's workforce. Although industry employment has expanded in all regions of the Nation, growth has been uneven. The trend has been toward a decline in the proportion of the industry's workforce in the Northeast and North Central States and an increase in the share located in the West and South.

For example, in March 1967 /the latest month for which such data--based on UI (unemployment insurance) coverage records--are available/ the Northeast accounted for 37 percent and the North Central Region for 32 percent of all workers in computing and accounting machines establishments. This was a sharp drop from the 50 percent and 38 percent shares of industry employment in these regions in March 1958. Reflecting the faster growth of the industry in the West and South, the West employed 25 percent and the South 7 percent of the workers in industry establishments covered under State UI laws in March 1967 compared with only 10 percent and 2 percent respectively in March 1958.

Over half of the nearly 182,000 UI covered workers in the industry in March 1967 were in three States. New York continued to lead with 44,500 jobs. Next were California with 33,500 and Minnesota with 22,500. (See table 3.) 1/

1/ State employment figures shown in table 3 differ from those in table 2, because the former represents totals for UI covered establishments, while the table 2 data are based on the BES November 1967 special survey.

In the years since 1958, in all but two of the nine States for which individual unemployment insurance coverage data may be disclosed, employment rose substantially. During this period the largest numbers of workers were added in California (25,300), Minnesota (17,000), and Massachusetts (9,600). Losses were relatively small and occurred in Michigan (1,600) and Connecticut (100).

Skill Shortages Impede Production

Some of the growing pains experienced by the industry have been the rapid obsolesence of computer models, lack of standards in programming, development of markets for used computers, and nationalization of foreign computer firms. However, one of the most persistent problems confronting the computing and accounting machines industry has been difficulty in recruiting qualified manpower.

Of the 102 establishments which participated in the USES survey, 54 stated that they were encountering shortages of personnel. Indications were that production was being restricted due to labor shortages in half of these firms. For example, one large firm stated that a shortage of electronics assemblers made it impossible to meet several contract dates on time. Another stated that its research and development activities have been slowed due to the shortage of electronics engineers.

Some 1400 openings were reported in shortage occupations. The workers most in demand include engineers (mechanical, electronic, and electrical), clerical workers (secretaries, clerk-typists, and stenographers), electronics assemblers, programmers, and electronics technicians.(See table 4.)

Regionally, some 40 percent of the unmet demand was located in the Northeast, 33 percent in the West, and 22 percent in the North Central States. The greatest number of serious manpower shortages, i.e., those impeding production to some degree, were reported in the West and Northeast.(See table 5.)

Although the need for certain occupations--engineers, electronics assemblers, and electronics technicians--appears to be common to all areas with large industry employment, other unmet demands appear more local in nature. The Los Angeles-Long Beach area, despite its 6 percent decline in industry employment for the year ending November 1967, reported a greater need for additional workers qualified in specific shortage occupations than any other area in the nation. The 14 plants in that area are recruiting for substantial numbers of industrial and electronics engineers, electronics assemblers, electronics technicians and mechanics, and production machine operators. Unmet demand for clerical personnel appeared greatest in the Minneapolis-St. Paul area, where there were also requirements for additional electronics technicians and assemblers, engineers--mechanical, electrical, and electronic--and draftsmen. In the New York City and Philadelphia areas, the strongest demand was for programmers, clerical workers, and engineers.

Table 3--Employment Trends in Computing and Accounting Machines Establishments Covered by State Unemployment Insurance Laws by Region and State

March 1958 to March 1967

Region and State	March 1967			March 1958			Percent change in employment March 1958 to March 1967
	Number of establishments	Employment Total	Employment Percent distribution	Number of establishments	Employment Total	Employment Percent distribution	
U.S. Total	256	181,822	100	108	86,929	100	+109.2
NORTHEAST	88	67,966	37.4	48	43,440	50.0	+ 56.4
Massachusetts	22	10,490	5.8	7	898	1.0	+1,068.2
Connecticut	8	1,543	0.8	7	1,611	1.9	-4.2
New York	37	44,460	24.5	26	37,714	43.4	+17.9
Pennsylvania	16	8,113	4.5	5	1,594	1.8	+409.0
Other 1/ Rhode Island and New Jersey (combined)	5	3,360	1.8	3	1,623	1.9	+107.0
NORTH CENTRAL	55	57,269	31.5	22	33,048	38.0	+73.3
Illinois	8	3,817	2.1	4	1,877	2.2	+103.4
Michigan	13	9,010	5.0	9	10,634	12.2	-15.3
Minnesota	18	22,506	12.4	4	5,521	6.4	+307.6
Other 1/ Ohio, Indiana, Wisconsin, Missouri, Nebraska, and Kansas (combined)	16	21,936	12.1	5	15,016	17.3	+46.1
SOUTH	25	11,811	6.5	9	1,596	1.8	+640.0
Maryland, District of Columbia, Virginia, North Carolina, South Carolina, Georgia, Florida, Kentucky, Alabama, Arkansas, Oklahoma, and Texas (combined)	25	11,811	6.5	9	1,596	1.8	+640.0
WEST	88	44,776	24.6	29	8,845	10.2	+406.2
Colorado	3	4,338	2.4	0	0	0.0	------
California	79	33,483	18.4	25	8,179	9.4	+309.4
Other 1/ Wyoming, Arizona, Utah, and Washington (combined)	6	6,955	3.8	4	666	0.8	+944.3

1/ Separate State data withheld to avoid disclosure of data for individual firms.

Source: First quarter 1958 and 1967 Unemployment Insurance data. State Employment Security Agencies.

Table 4--Selected Job Shortages Reported by Surveyed Computing and Accounting Machines Firms

November 1967

Shortage occupation	Establishments reporting shortages	Workers required in shortage occupations
Total	54	1,411
Engineers	39	216
Mechanical	7	62
Electronic	10	56
Electrical	8	55
Industrial	4	21
Not specified	10	22
Clerical workers	11	186
Secretary	4	83
Clerk-Typist	5	77
Stenographer	4	26
Electronics assembler	12	179
Programmer	12	178
Electronics technician	15	152
Draftsman	19	79
Production machine operator	6	74
Electronics mechanic	5	64
Machinist	11	43
Other occupations	20	240

Note: Establishments do not add to total since many firms reported shortages in more than one occupation.

Source: Employer reports compiled by State Employment Security Agencies.

Table 5--Surveyed Establishments and Establishments Reporting Job Shortages in Computing and Accounting Machines Industry by Region, State, and Selected Areas

November 1967

Regions and selected States and areas	Surveyed establishments	Establishments reporting job shortages	Workers required in shortage occupations	Establishments reporting job shortages impeding production
Total	102	54	1,411	25
NORTHEAST	39	17	553	10
Massachusetts	11	6	132	2
Boston	7	3	126	1
Connecticut	3	2	33	1
New York	16	5	239	4
New York City	7	4	176	3
Pennsylvania	6	2	124	3
Philadelphia	5	2	124	3
New Jersey	3	2	25	0
WEST	37	24	464	12
California	33	24	464	12
Los Angeles-Long Beach	20	14	271	8
San Francisco-Oakland	3	3	114	2
Anaheim-Santa Ana-Garden Grove	5	5	69	1
San Diego	3	2	10	1
Other 1/ Arizona, Colorado, and Washington (combined)	4	0	0	0
NORTH CENTRAL	14	9	310	2
Wisconsin	3	1	11	1
Minnesota	5	5	260	1
Minneapolis-St. Paul	3	3	238	1
Other 1/ Ohio, Michigan, and Illinois (combined)	6	3	39	0
SOUTH	12	4	84	1
North Carolina	3	0	0	0
Florida	3	1	22	0
Other 1/ Virginia, South Carolina, Okalahoma, and Arkansas (combined)	6	3	62	1

1/ Individual State figures withheld to avoid disclosure of data for individual firms.

Source: Employer reports compiled by State Employment Security Agencies.

Meeting Manpower Needs

Establishments were utilizing a variety of means to compensate for personnel shortages. The most usual approach was increased overtime. This was reflected in an increase in the industry's average overtime hours as indicated by Bureau of Labor Statistics data.

The second most frequent means appeared to be the utilization of women in jobs traditionally held by men. In one large establishment, women assemblers were taught repair work to offset a shortage of repairmen. Several establishments provided information on advances in technology which are helping to ease the manpower shortage. The use of automatic wire-wrapping and soldering devices, component insertion machines, conveyorized flow soldering systems, high speed machine tools, and the application of computers has reduced skill shortages and enabled badly needed labor to be transferred to functions not adaptable to mechanization.

Another technique used in reducing effects of the manpower squeeze was job restructuring. Instead of having machine operators set up their machines, plants have turned this function over to setup men; women then are employed as the machine operators. Others have added extra shifts and hired additional numbers of part-time employees.

Recruitment Efforts Intensified

Due to the industry's increasing production and expanding employment, the need for new employees and efforts at their recruitment have become increasingly significant. Recruitment of workers has been carried out through newspaper ads, local public employment offices, employees' recommendations, and gate hiring. Special recruitment campaigns on college campuses throughout the country to secure technical personnel have become more frequent.

Hiring specifications have been lowered by some establishments in an effort to compensate for the manpower shortage. The dropping of high school diploma as a prerequsite for employment and the lowering of experience and physical qualifications were reported by several establishments.

Some firms have coupled their need for additional manpower with the Nation's commitment to find jobs for the hard-core unemployed. One firm is hiring veterans who are being treated at a veterans' hospital--lowering hiring specifications in these cases. Another intends to hire and train disadvantaged workers from an opportunity center which is providing preliminary training.

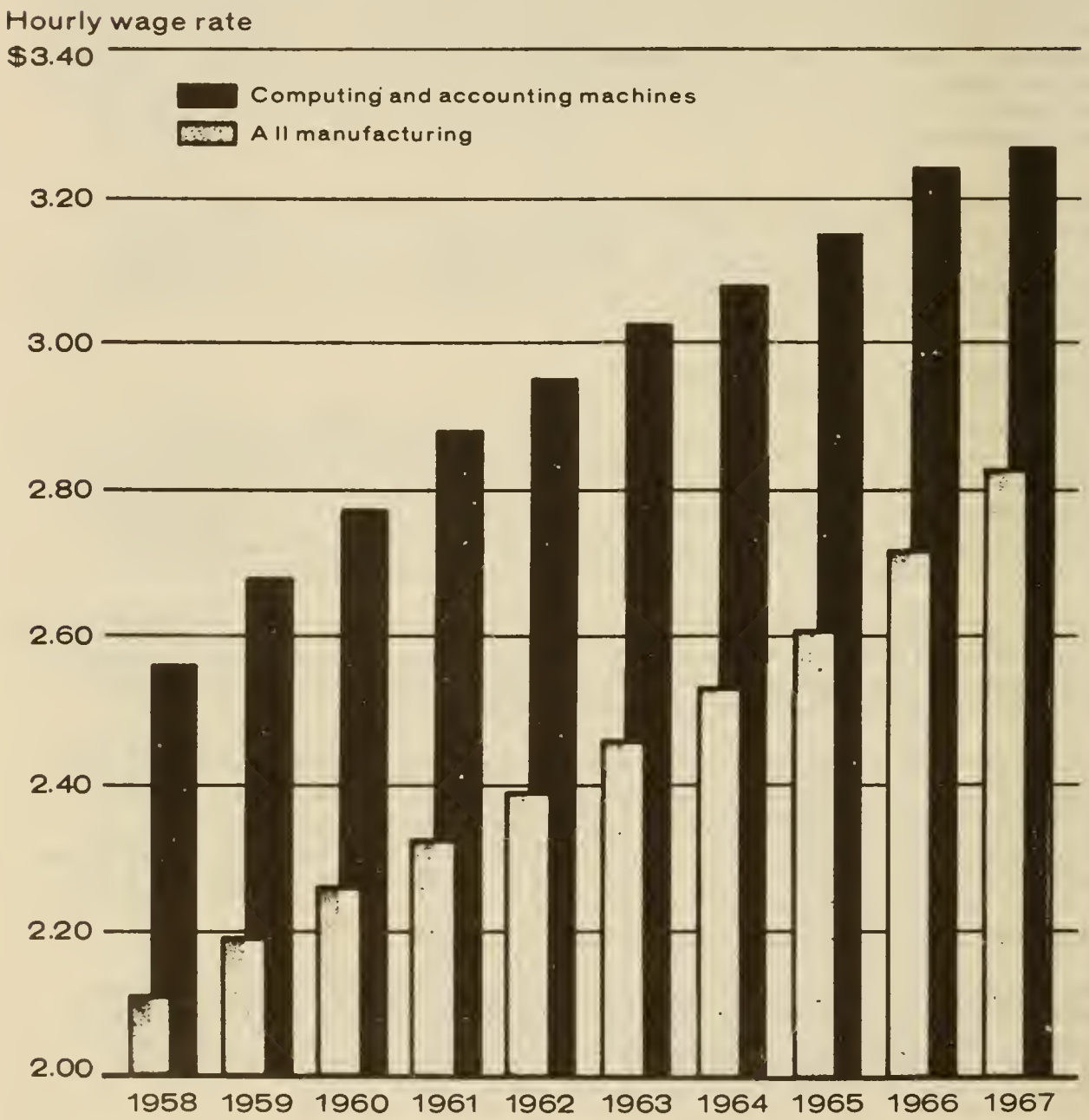
Wages and Hours Remain Above Manufacturing Average

The gap between hourly earnings in all manufacturing and the computing and accounting machines industry narrowed slightly during the 1958-67 period. However, the industry's average hourly production worker earnings remained 44 cent above the manufacturing average. (See figure 2.)

Figure 2.

Average Hourly Production Worker Earnings

COMPUTING AND ACCOUNTING MACHINES INDUSTRY AND ALL MANUFACTURING 1958-1967



Source: Bureau of Labor Statistics

Average hourly production worker earnings in the computing and accounting machines industry, which rose less than one percent during 1967, were $3.27. Earnings had increased almost 30 percent between 1958 and 1967. However, this is less than the 34 percent gain registered in manufacturing industries as a whole during the same period. Weekly hours worked by production employees averaged 42.1 during 1967, 1.5 hours more than the average in all manufacturing.

Job Training Offered by Most Establishments

Formalized job training programs have been instituted by most computing and accounting machines firms. These have been designed both to reduce current worker shortages and to help the industry prepare for expanding manpower needs in the future.

Most frequently reported was on-the-job training, offered to newly hired electronics assemblers and production machine operators. Apprenticeship training, also offered by a number of firms, has been limited generally to tool and die makers.

Many programs sponsored by funds allocated under the Manpower Development and Training Act are for occupations which have been reported in short supply by the computing and accounting machines industry. The largest numbers of MDTA graduates hired by the industry were reported to be assemblers, mechanics, draftsmen, and clerical workers. Under this legislation, the Employment Service has been given broad responsibilities in determining skill shortages and "reasonable expectation of employment" in relation to establishing courses to provide job training. In addition to paying training subsistence allowances when these are provided under the law, the Employment Service selects, tests, counsels, and eventually places MDTA trainees with employers.

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